A SUBMILLIMETER/MILLIMETER SPECTROMETER FOR HIGH REDSHIFT GALAXY SURVEYS

(To be presented at the Gamow Memorial International Conference, St. Petersburg, Russia, August 16-27, 1999)

Hien Trong Nguyen, James Bock, Mark Dragovan
Jet Propulsion Laboratory, California Institute of Technology

Brett Kornfeld
Department of Physics, California Institute of Technology

ABSTRACT

We propose to develop a moderate resolution millimeter-wave spectrometer cover a wide spectral range from 800 um to 2.3 mm. The spectrometer (BASS) will be the first instrument of its kind with the sensitivity and spectral bandwidth optimized for systematic follow-up observations of the far-infrared galaxies to be detected in the next generation of survey instruments, including the mm-wave camera BOLOCAM and SIRTF/MIPS. The spectrometer will use 4x85 bolometer array similar to those being developed for the ESA/NASA Planck Surveyor and FIRST sapce missions, but with significantly higher sensitivity. BASS will have bandwidth two orders of magnitude larger than existing heterodyne instruments, and sensitivity 10 times greater than Fourier-transform spectrometers coupled to direct detectors. The spectrometer will greatly reduce the time required to obtain a complete millimeter-wave spectrum of distant infrared-bright galaxies, making determination of millimeter-wave redshifts a practicality for the first time.